

Title	A NEW PARASITIC COPEPOD, PHILOBLENNA ARABICI GEN. ET SP. NOV., FROM A JAPANESE GASTROPOD, WITH PROPOSAL OF A NEW FAMILY PHILOBLENNIDAE (CYCLOPOIDA : POECILOSTOMA)
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**A NEW PARASITIC COPEPOD, *PHILOBLENNA ARABICI* GEN.
ET SP. NOV., FROM A JAPANESE GASTROPOD, WITH
PROPOSAL OF A NEW FAMILY PHILOBLENNIDAE
(CYCLOPOIDA: POECILOSTOMA)^{1,2)}**

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With Text-figures 1-16

The studies on parasitic copepods at the Seto Marine Biological Laboratory in 1971-72 produced some new representatives of poecilostomous cyclopoids from Japanese prosobranch gastropods. Following the preceding paper dealing with two species of the family Myicolidae, the present paper is to describe a remarkable new form obtained from an arabic cowry, *Peribolus (Arabica) arabica* (L.), under the name of *Philoblenna arabici* gen. et sp. nov. This new species was found attached by only the antero-ventral side of its head to the mantle surface just near the ctenidium of the host; this area was rich with mucous glands and furrows and was swollen to form knobs by parasitism of copepods.

A new family Philoblennidae is proposed on this new form, and its affinity is discussed generally.

Family Philoblennidae nov.

(Cyclopoida: Poecilostoma)

Diagnosis: Female—Cephalothorax including first pedigerous segment. First antenna filiform, probably 7-segmented. Second antenna prehensile, well developed, probably 4-segmented, terminally with 2 strong claws. Labrum conspicuously developed around the antero-lateral part of mouth and divided into a median and lateral lobes by constriction. Mandible terminating in a stout blade serrated on the convex margin and armed with spinular rows on both the convex and concave sides, but without accessory piece. Paragnath as a small lobe with the distal margin spinulose. First maxilla non-segmented, elongate, distally with 4 setules. Second maxilla prehensile, 2-segmented; second segment forming a strong claw. Maxilliped 3-segmented, somewhat reduced; terminal segment unguiform, with a spine. First

1) Contributions from the Seto Marine Biological Laboratory, No. 625.

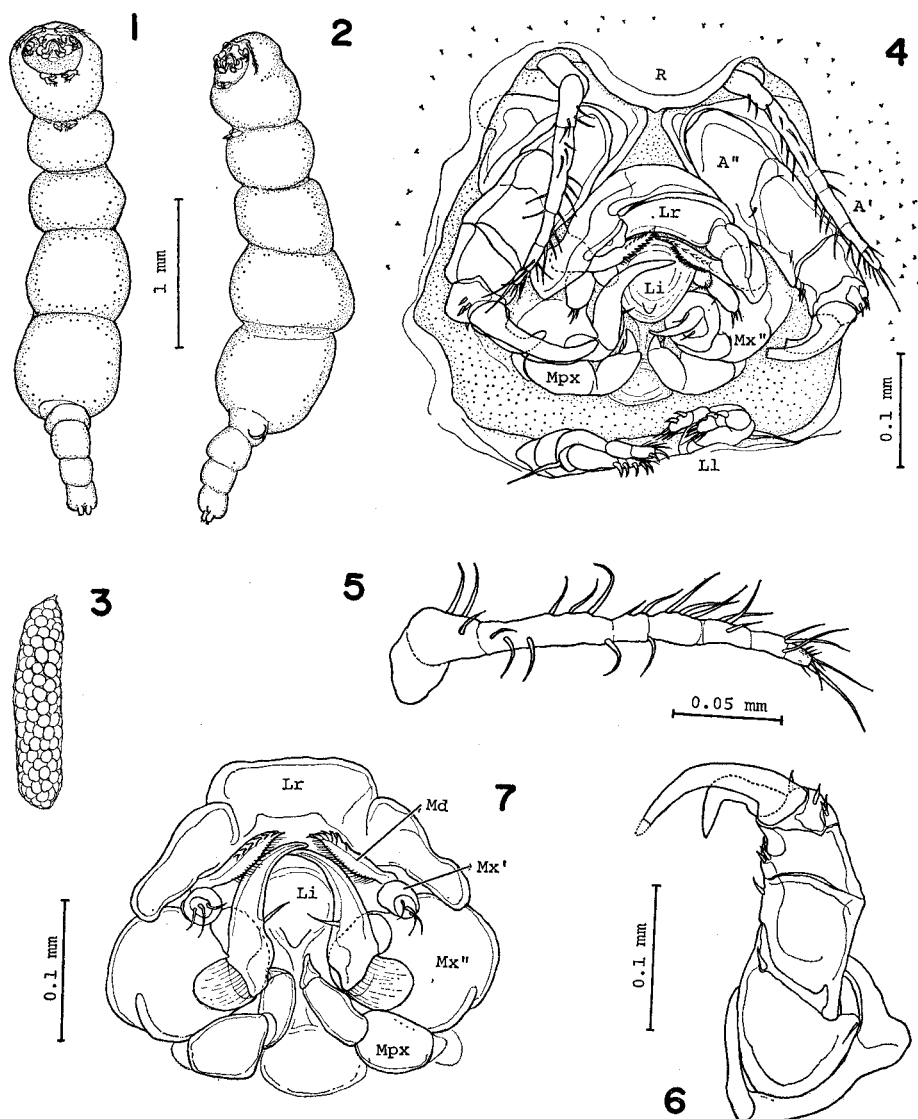
2) This work was partly supported by grants in Aid for Miscellaneous Scientific Researches from the Ministry of Education (Nos. 874226 and 974236).

two pairs of legs present, though small.

Type genus: Philoblenna nov.

Genus Philoblenna nov.

Diagnosis: Female—Body cylindrical, without any outgrowth; consisting of



Figs. 1-7. *Philoblenna arabici* n. gen., n. sp., female. 1. total view, ventral. 2. the same, dorsal. 3. egg sac, magnified as in Figs. 1 & 2. 4. cepalic appendages and first legs in situ, ventral view. 5. first antenna, ventral view. 6. second antenna, ventral view. 7. labrum and oral appendages in situ, ventral view. Abbreviations: A'-first antenna, A''-second antennae, Ll-left first leg, Li-labium, Lr-labrum, Md-mandible, Mx'-first maxilla, Mx''-second maxilla, Mpx-maxilliped, P-paragnath, R-rostrum.

plump prosome and abruptly narrowed urosome; metamerism distinct. Prosome divided into cephalothorax and four metasomal segments. Urosome 4-segmented; first urosomal segment genital. Cephalothorax with an antero-ventral concavity holding cephalic appendages and first legs within it.

Cephalic appendages through maxilliped as in the familial diagnosis. First two pairs of legs carrying 3-segmented exopodite and 2-segmented endopodite.

Egg sac of a sausage-shape; eggs multiseriate. Nauplii lecithotrophic.

Male unknown.

Type species: *Philoblenna arabici* n. sp., parasitic on a prosobranch gastropod.

Etymology: *Philoblenna* (feminine) from the combination of *philos* (loving) and *blennos* (slime); *arabici* from the specific name of the host.

Philoblenna arabici n. sp.

(Figs. 1–16)

Material: 6 females, including 2 ovigerous ones, from the mantle surface of *Peribolus (Arabica) arabica* (Linné) [Mesogastropoda: Cypraeidae] collected in the vicinity of Seto on September 18, 1971. Holotype (female) and 5 paratypes are deposited at the Seto Marine Biological Laboratory of Kyoto University.

Female: Length 2.16–3.28 mm and 2.87 mm on an average; greatest width or thickness 0.46–0.72 mm and 0.60 mm on an average of 6 specimens. Body (Figs. 1 & 2) cylindrical, gently bent ventrally; metamerism distinct. Cephalothorax and 4-segmented metasome plump, especially third and fourth metasomal segments somewhat expanded with maturation. Cephalothorax with a shallow concavity on the antero-ventral side, holding cephalic appendages through maxilliped and first leg within it (Fig. 4). First metasomal segment carrying second leg on the ventral side at the anterior margin. Succeeding segments naked, but first urosomal segment with gonopores each opening on the lateral side and anal segment with small caudal rami. In holotype, proportional lengths and widths of cephalothorax and succeeding 8 segments as follows:

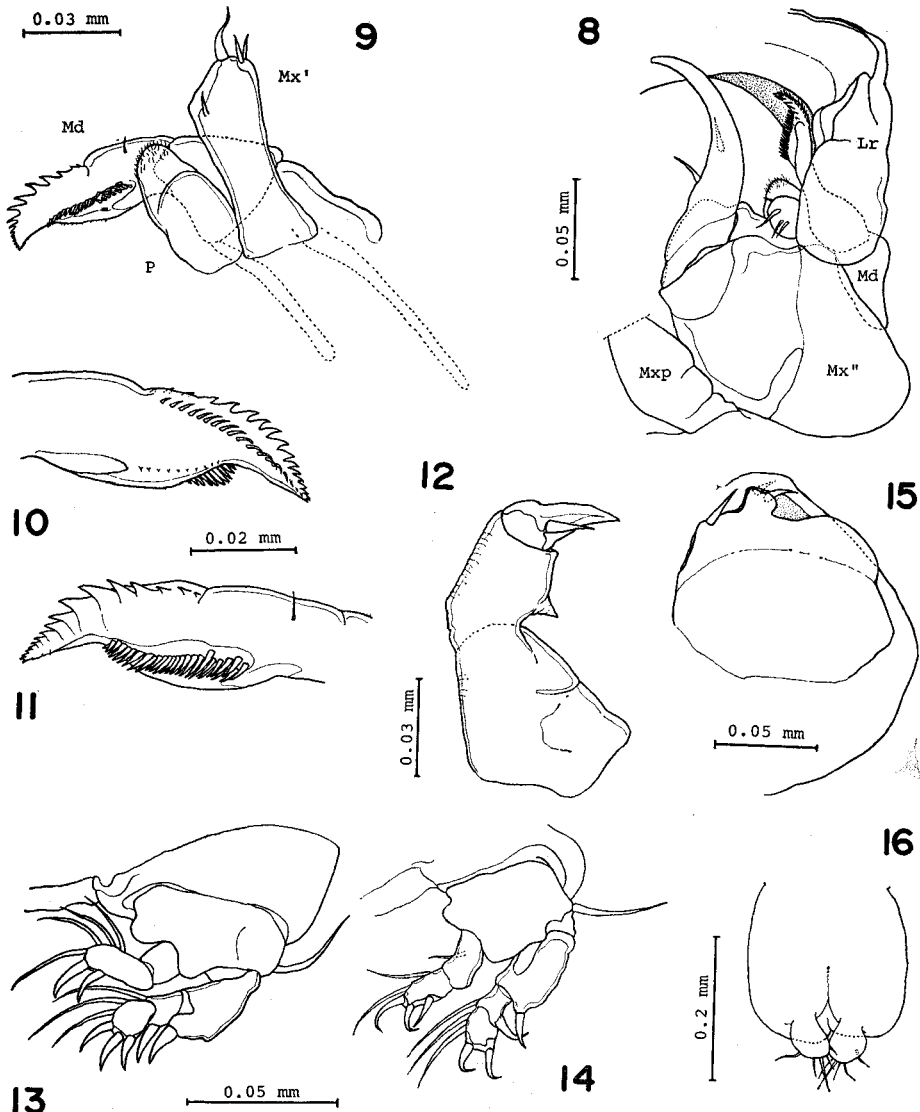
Cephalothorax		Metasome				Urosome				total
		1	2	3	4	1	2	3	4	
Length	18.0	12.3	13.1	14.8	20.5	4.5	7.0	4.9	4.9	100
Width	1	0.95	1.09	1.14	1.16	0.52	0.45	0.38	0.33	

Body fleshy, somewhat soft; pale yellowish white in prosome, translucent in urosome; eyes somewhat deeply buried under hypodermis in the anterior portion of cephalothorax and silverly orange.

Egg sac (Fig. 3) sausage-shaped, ca. 1.4×0.3 mm; eggs multiseriate, pinkish and translucent, ca. $130 \times 120 \mu$ on an average.

Rostrum (Fig. 4) moderate, with the round posterior margin. First antenna (Fig. 5) filiform, indistinctly 7-segmented; spinular formula 3, 7, 3, 3, 3, 3 and 9; aesthete indistinguishable. Second antenna (Fig. 6) probably 4-segmented, robust;

proximal two segments relatively large, each with a medio-distal spinule; third and fourth segments wider than long, shorter than second segment in combined length. Third segment with 3 median spinules at the middle. Fourth segment hemispherical, in addition to 4 spinules on the outer distal margins 2 large claws of different sizes on the medio-distal margin; longer claw about half as long as the whole appendage and curved rather gently, while the shorter one bent sharply at the middle. Labrum



Figs. 8-16. *Philoblenna arabici* n. gen., n. sp., female. 8. labrum and oral appendages in situ, ventro-posterior view. 9. mandible, first maxilla and paragnath in situ, posterior view. 10. mandibular blade, anterior view. 11. the same, posterior view. 12. maxilliped, posterior view. 13. first leg, anterior view. 14. second antenna, anterior view. 15. gonopore and its circumference, lateral view. 16. anal segment and caudal rami in situ, ventral view.

(Figs. 4, 7 & 8) prominent surrounding the antero-lateral part of mouth, divided into a median and lateral lobes by constriction; each lateral lobe reaching posteriorly the base of second maxilla. Mandible (Figs. 7-11) somewhat narrowed and bent around the middle; the basal half unarmed, while the distal half forming a stout terminal blade. Terminal blade (Figs. 10 & 11) about 3 times as long as wide, somewhat swollen around the middle, curved and pointed distally, and armed with a serration of ca. 16 teeth on the convex margin, a row of ca. 18 spinules on the anterior side of the same margin, a row of ca. 27 spinules closely set on the posterior side of the concave margin and an isolated simple spinule near the base of the convex margin. Paragnath (Fig. 9) a small lobe, about two times as long as wide, with spinulose distal margin. First maxilla (Fig. 9) elongate, about 3 times as long as wide, slightly narrowed in the middle, and carrying a subapical and 3 apical spinules. Second maxilla (Figs. 7 & 8) stout, 2-segmented; first segment massive, almost as long as wide, unarmed; second segment forming a large claw smoothly curving and bearing 2 medial setules near the middle. Maxilliped (Fig. 12) 3-segmented; first segment somewhat depressed antero-posteriorly; second segment incompletely separated from first segment, with a conical process at the middle on the median margin; third segment unguiform, about half as long as second segment, with a spine on the base. A round swelling of sternum surrounded by labrum and oral appendages probably representing labium (Figs. 4 & 7, Li). Another similarly elliptical swelling found between maxillipeds probably showing a part of sternal plate of maxilliped.

First two pairs of legs (Figs. 13 & 14) very small, biramous, each consisting of 2-segmented protopodite carrying an outer-distal seta on the second segment and 3-segmented exopodite and 2-segmented endopodite; these rami armed all with naked setae and spines as in the following formulae (number of spines in Roman and that of setae in Arabic numerals).

	Exopodite	Endopodite
Leg 1	I-0; I-1; III-2	0-0; II-4
Leg 2	I-0; I-1; II-2	0-1; III-2

Caudal ramus (Fig. 16) lobe-like, with 5 spinules on the distal margin.

Male: Unknown.

Discussion

Philoblenna arabici gen. et sp. nov. resembles in the body shape *Ameristocheres inermis* Pelseneer which was found on a cephalaspid opisthobranch, *Doridium membranaceum* at Naples, but the former differs from the latter in that the final thoracic segment corresponding to the fifth pedigerous one is swollen and joined to the pro-some; the same segment is not swollen and represents the first urosomal segment in the latter. The genus *Ameristocheres* was established by Pelseneer (1928) to accommodate his species, however, any cephalic or thoracic appendages were not found on the specimens and no suggestion was given as to the systematic position of this

genus by the author. Unfortunately neither further study on the specimens nor rediscovery of the same species has been made so far, the present author, therefore, cannot have any idea of the relation between the present new genus and *Ameristocheres*.

As the structures of the second antenna and maxilliped of *P. arabici* are clearly indicated, this new genus undoubtedly seems to be closely related to the lichomolgid complex. Its mandible is more or less modified, but seemingly deducible from the same organ of the lichomolgid complex. However, the second maxilla with the second segment forming a strong claw and the labrum developed remarkably of the present new form are unusual in any families of the superfamily Lichomolgoidea (Humes and Stock, 1972, 1973) or in the family Myoicolidae. Therefore, on characteristics of the mandible, the second maxilla and the labrum of *Philoblenna* gen. nov. a new family Philoblennidae is proposed here, though with a slight hesitation because of a state of complete ignorance of the male.

Among the parasitic or semiparasitic poecilostome cyclopoid genera recorded so far, only *Briarella* Bergh, 1876, a genus parasitic to nudibranch gastropods, shares the similar second antenna, second maxilla and labrum. Monod (1928) studied cephalic appendages of the genus *Briarella* on his new species and deposited the genus in the family Chondracanthidae in accordance with Hancock and Norman (1863) and O'Donoghue (1923) who placed the genus *Splanchnotrophus* Hancock and Norman, also parasitic to nudibranchs, in the same family. However, Monod et Dollfus (1932) transferred *Briarella* later to the family Splanchnotrophidae, established by Norman et Scott (1906) on the genus *Splanchnotrophus* together with two other genera *Ismaila* Bergh (1867) and *Chondrocarpus* Bassett-Smith (1903) also parasitic to opisthobranch gastropods. Laubier (1964) made the distinction between Splanchnotrophidae and Chondracanthidae clear through his detailed examination on the mouth parts, comprising the mandible of a peculiar form and the second maxilla with a secondary spine, but no maxilliped on the genus *Splanchnotrophus* and further mentioned that the inclusion of the genus *Briarella* in the Splanchnotrophidae was difficult and that the genus was yet close to the Chondracanthidae. But, even the inclusion of *Briarella* in the Chondracanthidae seems to the present author somewhat difficult because of the essential difference in the morphology of the second antenna. In the Chondracanthidae, the strong prehensile claw of the second antenna seemingly originates from the proper penultimate segment and its ornament, and the proper terminal segment and its armature are much reduced (Izawa, 1975). On the other side, the same appendage of *Briarella* is essentially of a lichomolgid type as well as that of the *Philoblenna*. The state of the second antenna in the Chondracanthidae is regarded as the final phase of the tendency that a claw of the penultimate segment develops aberrantly, which is seen in some genera of the family Sabelliphilidae, such as *Calypsarion*, *Calypcin*, *Caribulus*, *Chauliolobion*, *Lecanurius*, *Lichothuria* and *Scambicornus*.

As shown above, the genus *Briarella* is probably related to the lichomolgid complex and may be included in the Philoblennidae, though more detailed knowledge of the mouth parts of *Briarella* is requested to make this decisive.

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